

A	RRRR	PPPP	A	N	N	EEEE	T1TTT
A A	R R	P P	A A	NN	N	E	T
A A A	RRRK	PPPP	A A	N N	N	EEE	T
AAAAA	R R	P	AAAAA	N	NN	E	T
A A	R R	P	A A	N	N	EEEE	T

N	N	EEEE	W	W	SSSS
NN	N	E	W	W	S
N	N	EEE	W	W	SSSS
N	NN	E	W	W	S
N	N	EEEE	WW	WW	SSSS

Issue 4

June 1973

ARPA Network Information Center
Stanford Research Institute
Menlo Park, Calif. 94303

ARPANET NEWS The Monthly Online/Hardcopy ARPANET Newsmagazine
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Jean Iseli (MITRE)

Contributing Editor: Susan S. Poh (MITRE)

The online version is sent to all Network members who receive online delivery from NIC. It can also be accessed by anyone who logs into SRI-ARC and uses the query language named NIC.

The online version contains the month's basic issue. Each week a branch is added, containing items received during the week. This update material is added to the new feature articles to produce the next month's issue.

For scanning on TTY:

```
control c
nic CR
s/rpanet news! CR
s/how] (whatever you choose from the contents) CR
(to stop printing) control o (to exit) q/uit/ CR
(to show statement numbers) v/:type View specs:/ mG CR
```

For printing NEWS:

```
nls CR
l/oad/ f/file/ <nic>arpanewscover CR CR (for cover, masthead)
or
l/oad/ f/file/ <nic>arpanews CR CR (for NEWS contents)
or
l/oad/ f/file/ <nic>arpanewsup CR CR (for UPDATES only)
o/utput d/evice t/eletype/ CR
```

One hardcopy of the monthly issue will be sent to each Liaison, Principal Investigator, and Station Agent at Network Sites, and to Network Associates. Local reproduction is encouraged.

Contributions to the NEWS may be forwarded to JI at NIC through the Journal, to ISELISUSC-ISI, or to Jean Iseli, The MITRE Corporation, National Systems Design Dept. Westgate Research Park, McLean, Va. 22101. News may also be forwarded to JBN through the NIC Journal, or mailed to Jeanne North at SRI.

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CALENDAR Events of Network Interest
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Schedule

*7/16-17 (NGGMEET) NGG at U of Illinois
*7/23-24 (PRGMET) UCLA
7/30-8/1 (SCRL) Linear Prediction of Speech
8/14-15 CHINESE
*8/20-24 (SU-AI-CON) Online demos
1/8-10 74 (HAWAII-CON)
8/5-10 74 (IFIP) Congress '74
10/15-17 IEEE
11/13-15 DATA-SYMP

Meetings announced in earlier issues are listed here without parenthesis.

A meeting listed here is sponsored by the Group named. Many meetings are open to other interested people. NIC document references are given where available.

Meetings sponsored by Groups in the Network are indicated by *

(NGGMEET) Network Graphics Group Meeting
July 16-17 at University of Illinois. Contact Steve R. Bunch,
(217) 333-9354. Announced in RFC 537, NIC 17498.

(PRGMET) Packet Radio Group Meeting
July 23-24 at School of Engineering and Applied Science, UCLA.
Announced in PRT Note 65, NIC 17345.

(SCRL) Linear Prediction of Speech, Theory and Practice
July 30 - August 1 1974. 3-day course to present state-of-the-art,
with Dr. John D. Markel, Dr. A. H. Gray, Jr., and Dr. Hisashi
Wakita instructing. 3325. Contact: Dr. Markel, 800 A Miramonte
Drive, Santa Barbara Calif. 93109, (805)965-3011.

(SU-AI-CON) Online demos
August 20-24 1973. Several A.I. programs will be demonstrated
(some over the ARPA net) at the Third International Joint
Conference on Artificial Intelligence, Stanford University. If you
have a program that you would like to demonstrate, contact Warren
Teitelman, Xerox Palo Alto Research Labs, 3406 Hillview Avenue,
Palo Alto, Calif. 94304.
....from conference announcement, NIC 16532

ARTICLES

MULTICS PROGRESS

.... Mike Padlipsky

On the Multics front, several things are popping. Of most immediate concern, of course, is the transition from the current hardware (Honeywell 645) to follow-on hardware (Honeywell 6180). More information on this score will be made available when we take our turn as "Featured Site" in the ARPANET NEWS, but the highlights of the new hardware include: doubled hardware speed, hardware-implemented "ring" protection mechanism, bulk store instead of drum, and extended instruction set for character-oriented operations.

As the new machine is not physically located in the same building, one of the Network group's major efforts of late has been converting to distant interface operation. We are still working (as of June 1) on the special interface hardware at our end. We think the software is ready to go, and we're told that our port is one wire-pull away from being a distant interface port. Target date for changeover is July 1, although it might slip if the M.I.T. Information Processing Center (which "owns" the machine) slips acceptance of the machine, as we will not make the Network changeover until at least two weeks after the start of "Trial Service" (which in turn does not begin until after acceptance).

A couple of new software facilities are of potentially large long term interest: A new LISP is available (compiler and interpreter), which I'm told is faster than many. Also, Project MAC Mathlab's MACSYMA system will be available as a Multics subsystem on the 6180. Details about both LISP and MACSYMA will be available in "help" files, the names of which will be announced in our message of the day -- and in the ARPANET News as soon as I learn them. Cheerful final note: TENEX's "sndmsg" command has been modified to do those aspects of the File Transfer Protocol which make it work with Multics (see RFC 491 for the underlying technical problems).

As far as I know, BBN, ISI, and Utah have already installed the new version, with others presumably to follow. I'd like to express my personal thanks to those who helped make the change, for they saved a large amount of contortion at our end by being willing to make a small twist at theirs. To get to the Multics Network Technical Liaison, use "map.cn" (or "Padlipsky.CompNet") as the address. Note, by the way, that sndmsg sends mail through a Telnet connection, so that our "erase" and "kill" conventions will be in effect. Therefore, beware: @ is our "kill the whole line" character, so either say "@" or type \"@ (where the \ is meant to be a backslash or left slant -- our software escape character). Erase character is #; it too may be escaped.

NEWS FROM THE NIC

===== Publications Issued by the NIC
.....Mike Kudlick

The workload of production, reproduction, and distribution of NIC publications has increased as the number of sites, hosts, and individuals using the Network has increased. It has therefore become increasingly important for us to be certain we produce and distribute only those documents that are most useful to the Network.

The best way we can determine which documents are useful is through occasional sampling of your needs. The accompanying questionnaire is designed for that purpose. To read the questionnaire online, the appropriate NIC/QUERY command is "s" (for show) "quest<cr>" (for the questionnaire). We also welcome, of course, any additional comments not directly provided for in the questionnaire.

Our present plans contain several options which will be weighed for each document produced at the NIC:

- 1) discontinue any publications for which there is no expressed need;
- 2) increase the frequency of publication (and distribution) of often-used documents;
- 3) distribute some documents on request only, possibly via rTP mechanisms if document size permits;
- 4) rely on users having access to up-to-date documents online, with only occasional hardcopy publication and distribution.

Your responses to our questionnaire will help determine which options should be followed for the NIC documents.

You may reply in whatever way seems appropriate: through FTP mail (NORTH @ SRI-ARC), through the NIC Journal to Jeanne North (JSN), or through the US Mails.

The NIC's US Mail address is:

Jeanne North
Network Information Center
Stanford Research Institute
Menlo Park, Calif. 94025

The questionnaire is printed in duplicate at the end of this issue. If you have not answered online, please mark your answer on a copy and return to NIC.

FEATURED SITE UCSD-CC U C San Diego Computer Center
*****Ken Bowles

INTRODUCTION

UCSD-CC is the campus computer center of University of California at San Diego. The Center's large Burroughs B6700 provides both Server and User access to the ARPANET. UCSD-CC operates as a cost recovery service center, currently with excess capacity and seeking additional ARPANET users.

5

5a

STATUS OF PROTOCOLS

5b

TELNET: User and Server fully operational. Basic LOGIN information and full HELP facility should be available without logging in by mid June.

File Transfer Protocol: User and Server basic services now being tested. Full release to users planned for early June.

RJE Protocol: Release of basic User/Server version planned for end of June. More extensive version for late July.

OPERATING SCHEDULE

5c

(Pacific Time) Weekdays - 0830 thru 1800, 2000 thru 0300 1800 thru 2000 May also be available (check NEWS) Saturday - 1500 thru 2100 Sundays and Holidays - 0900 thru 2100

B6700 DESCRIPTION

5a

Mature Virtual Memory system with automatic Working Set control. Overlayable segments have no fixed length as would be true on a paged virtual memory system. A single user may have up to several million words of virtual memory. Real memory limited for one User to roughly 40K 48-bit words during prime shifts, and roughly 100K words nights and weekends. Virtual storage is on head-per-track disk with 23 ms access time. Segments belonging to most interactive tasks are rolled-in en masse for bursts of processing using the B6700 SWAPPER. Maximum practical WORKINGSET for an interactive task is currently about 25K. A substantial increase in this limit is expected in Fall 1973.

Recursive Stack processor architecture based on ALGOL Block structure. Allows up to 30 levels of nesting of Blocks and Procedures. No formal limit on number of recursive procedure calls, though the practical limit is a maximum stack size of about 10K words. Recursion implies no extra calling overhead.

Branching "Cactus Stack" structure allows flexible Inter Process Communication (IPC). A user task may initiate and control one or more dependent tasks either synchronously or asynchronously, or it may initiate independent tasks. Software interrupts provided for control. Parent task has access to status information on dependent tasks.

All system software is written in an extended version of ALGOL. There is no Assembly Language. All compiled code is reentrant, regardless of language, and multiple concurrent tasks share one copy of the same code file. Code segments are not mixed with data of other kinds in storage. They are read-only from disk for overlay purposes.

User disk files embody fixed length logical and physical records. Disk space is allocated in AREAS containing one or more physical records. An expanding file is allocated only the minimum number of AREAS needed to accomodate the extant logical/physical records, and additional AREAS are allocated by the operating system without user intervention. Disk records are addressed by logical record number, and the user needs no knowledge of quantities such as track, cylinder or sector number. Disk space is physically addressed in units 180 bytes (1440 bits) long called SEGMENTS. Roughly 180 Million bytes are currently available for users, with about 40 Million needed for short term files and overlay space. More will be added based on demand from users.

UCSD has two Central Processors, each having raw computational speed comparable to the IBM 360/65 for arithmetic operations. Bit and string manipulation hardware makes the processors unusually fast for handling partial-word fields, and for many string operations (MOVE, SCAN, COMPARE, TRANSLATE, Scan for Set MEMBERSHIP, Input/Output Integer CONVERT, Field-Extraction, Pictures). Internal code is 8-bit EBCDIC. Hardware supports strings of bytes with 0, 6 or 4 bit width. Compilers accept input in EBCDIC, ASCII or BCL (Burroughs version of 6-bit BCD).

POINTS OF INTEREST

Flexible Workflow: The user's operating environment represents a continuum ranging from pure interactive to pure batch oriented. Interactive users run at Q1 priority. Design turnarounds by batch queue are: Q2 - 2 minutes, Q3 - 20 minutes, Q4 - 3 hours, Q5 - 8 hours or overnight. 95 percent of all jobs fall within these turnarounds, and averages are about 60 percent of the times given. Processor time charges are \$225, \$150, \$100, \$65, and \$30 for Q1, Q2, ..., Q5 respectively. About 25 percent of all batch jobs are submitted by interactive users, another 25 percent by RJE users. System commands allow interrogation about job status, changing of queues after submission, designation of output destination, etc.

Access to Resources: Remote users (both interactive and RJE) have virtually full access to all B6700 facilities available to local users. All peripheral devices and remote stations are regarded as files whose parameters are specified with FILE ATTRIBUTES. Attributes may be specified or altered at compile-time, run-time, or dynamically (ALGOL or COBOL only). Any program can be made to communicate with an interactive terminal. Remote users may request tapes to be mounted, purged, stored, snipped, etc.

ALGOL: Burroughs Extended ALGOL is a prime attraction of the B6700, and it is used for programming virtually all system software. Extended constructs are provided for manipulating bit fields, strings, CASE statements and expressions, IPC, Macro Definitions, Sort/Merge, program monitoring, and other special facilities.

Interlanguage BINDER: Allows intermingling of object code modules in ALGOL, COBOL and FORTRAN to form a single resulting program unit.

Common Languages: -- Compilers: ALGOL, BASIC, COBOL, FORTRAN IV-H, PL/1 -- Interpreters: APL (Selectric, Tektronix 4013, and mnemonics), BASIC, LISP (most of BBN-LISP), SNOBOL4.

Special Purpose Languages: -- Statistics: SPSS, BASIS (Burroughs Statistical Inquiry System) -- Simulation: GASP, SIMULA, DYNAMO -- Graphics: AMESPILOT (oriented to physical science and engineering, see CACM, Vol 13 #9, Sept 1970, 546-555) -- Cross Compilers and Assemblers: MIXAL (with MIX simulator) ASK, GLYPNIR (ILLIAC IV) PEESPOL (Univ Illinois Extended ALGOL for PDP 11) Assemblers for PDP8, Nova, MICRO 810 -- Econometrics: ESP -- Linear Programming: ALPS (Burroughs package)

Editing: The standard system monitor to which all interactive users are connected initially by default is the B6700 Command AND Edit package called CANDE. CANDE provides commands to initiate and control users programs, to manipulate and search user work files, to edit text within a line, and to inquire about system status. Interactive programs generally run as dependent processes of CANDE.

GETTING INFORMATION AND ASSISTANCE

OnLine: (HOST # 35) Enter the command HELP. The HELP program is self documenting and contains information on all aspects of the Center's work. A major rewrite of the HELP file is now under way. By Fall 1973 all of the Center's user support documentation will be issued via the HELP system. (Incidentally HELP is a general purpose program available for user's files also.) Enter the command MAILBOX (self documenting program). Leave a message for the Center's consulting staff in the MAILBOX under the usercode ZZ1. Send a line-at-a-time message to the online consultant using: ?TO ZZ1 text of message

Consulting by Telephone: (714)453-2000 ext 1681 Craig Maudlin, Terry Layman, Jerry Fitzsimmons.

New Accounts or Revised Services: (714)453-2000 ext 1681 Ken Bowles, Ed Coughran, Hank Fischer or Ken Bowles Box 109, La Jolla, Ca 92037

PROTOCOLS

=====

HARV-10-RJE

6
6a
RFC 499, NIC 15716 is being issued in June to give procedures for on-Site and off-Site users.

See also UCSD-PROTOCOLS

6b

RESOURCE NEWS

=====

BBN-TIPCOPY

7
7a
A new subsystem, TIPCOPY, provides the means for sending TENEX text files to a TIP port through a separate data connection. Plans call for TIPCOPY to become a standard TENEX subsystem - however, at the present time, it exists as:

- o <IMPGUYS>TIPCOPY.*;* at USC-ISI
 - o <SUBSYS>TIPCOPY.*;* at BBN
 - o <SUBSYS>TIPCOPY.*;* at CCA-TENEX

TIPCOPY provides simple formatting: tabs are set at every eight positions, and at user option, headings and page numbers can be provided, and page length may be set either to about 60 lines or to infinity.

To use TIPCOPY, the TIP port has to be set wild (@#S D W(LF)) and input to TIPCOPY must be typed in uppercase. Any problems in its use should be reported to WALDEN@BBN.

.....Susan Poh

BBN-TECO

7b

A new version of TENEX TECO is out; several new features have been added, including a ";S" command to save a text file without clearing the text buffer and a terminal dependent backspace command. For detailed description of the new features, see <SOURCES>TECO.MEMO at BBN. Problems should be reported to Bill Plummer at BBN.Susan Poh

PLATO

7c

The terminal writes 180 characters or draws 60 connected lines per second. A word typically contains three 6-bit character codes or one 18-bit panel address. The character generator has 126 standard characters plus 126 characters whose shapes are transmitted from the computer and stored in the terminal's memory (8x16 matrix). There is room on the panel for 32 lines of 64 characters. As of March 1973, about 230 terminals were connected to a Control Data Corporation (CDC) 6500..

ARPA is buying PLATO terminals for use on the ARPANET. According to Dr. Tom O'Sullivan at ARPA: "...ARPA is modifying some of the PLATO plasma terminals that are in use as a part of the Human Resource Research Offices Program. The modification has two parts:

(1) To modify the PLATO I/O formats to be network compatible so that a computer based instruction user can access the PLATO system through the ARPANET, and

(2) To translate PLATO terminal commands and data so that it will look to the network like a standard graphics terminal and permit users to access the UCLA Simulation Lab Machine soon to be available on ARPANET. This modification will also allow computer based instruction users and simulation lab users to gain access to DNLS at SRI, the Data Machine and other useful network resources.

It is expected that the first modification will be ready this summer and the second sometime this winter."

....Extracted by Susan Pon from a paper given by Donald Bitsez, University of Illinois and a message from Dr. Tom O'Sullivan, ARPA/HumRRO.

PLATO-IV

7d

PLATO IV, a low cost computer-based Education System, is under development by the Computer-Based Education Research Laboratory of the University of Illinois. When fully implemented, the PLATO IV system will consist of a large central computer facility simultaneously serving several thousand state-wide users of graphics terminals with response times of a fraction of a second. The estimated cost per user hour will be \$.50, including operating expenses such as communications charges, management, and amortization of capital costs for the computer and terminals.

The heart of the PLATO IV terminal is a plasma display panel, supplied by Owens-Illinois, with measurements of 8.5" by 8.5" by 0.5", which is a transparent 512 by 512 dot-matrix with inherent memory. Individual dots can be written or erased without disturbing the rest of the display. Terminals incorporating plasma panels are being built by Magnavox / Ft. Wayne according to PLATO specifications. These terminals contain character and line generators, special keysets, input/output ports for external equipment, and interface electronics to a 1200 bit-per-second telephone line.

See also MULTICS

7e

PLANS (No items in this issue)
=====

OTHER NEWS (No items in this issue)
=====

FORUM
=====

A User FORUM in the ARPANET NEWS

This new feature of the ARPANET NEWS was announced in the May issue. It is the purpose of this section to provide a forum for an ongoing dialogue between Network members on subjects of user interest. This forum is open to individuals to offer suggestions relative to ensuring a graceful ARPANET evolution.

The editors will consider for publication all received articles and comments. Submissions should be directed to ISELLI@USC-ISI, to JI at NIC through the NIC Journal, to JBN at NIC through the Journal, or mailed as hard copy to Jeanne B. North at SRI-ARC or to Jean ISELLI at MITRE-TIP.

10a

10b

10c

8

9

10

10a

10b

10c

QUESTIONNAIRE on NIC Publications
=====

Your name..... Organization.....

1. Please check applicable boxes:

NIC docs in hardcopy	own copy	have access	use 1/month	use more	use less
-----	-----	-----	-----	-----	-----
Directory of Participants	...:	...:	...:	...:	...:
Current Catalog	...:	...:	...:	...:	...:

2. Check level of use you make of each section of the Directory:

Directory of Participants	indispensable	very useful	useful	not useful	no opinion
-----	-----	-----	-----	-----	-----
Individuals, Brief (Name, phone)	...:	...:	...:	...:	...:
Individuals, Full entry	...:	...:	...:	...:	...:
Groups (name, address etc., of all members)	...:	...:	...:	...:	...:
Index of Idents	...:	...:	...:	...:	...:
Organizations (name, address of org, with names of people)	...:	...:	...:	...:	...:

Would you miss the listings of people in each organization if they were discontinued?

Comments about Directory.....

3. Check level of use you make of each section of the Catalog:

Current Catalog of the NIC Collection	indis- pensable	very useful	not useful	no opinion
Author Index	...:	...:	...:	...:
Number Index	...:	...:	...:	...:
Titleword Index	...:	...:	...:	...:
Listing (with abstracts)	...:	...:	...:	...:

Would you miss the abstracts if the Listing were discontinued?

Are RFC's almost the only items you refer to in the Catalog?

Comments about Catalog Indexes and Listing.....

QUESTIONNAIRE on NIC Publications

Your name..... Organization.....

1. Please check applicable boxes:

NIC docs in hardcopy	own copy	have access	:	use 1/month	use more	use less
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?

Directory of Participants:...: ...: : ...: ...: ...:

Current Catalog ...: ...: : ...: ...: ...:

2. Check level of use you make of each section of the Directory:

Directory of Participants	indispensable	very useful	useful	not useful	no opinion
---------------------------	---------------	-------------	--------	------------	------------

Individuals, Brief
(Name, phone) ...: ...: ...: ...: ...: ...:

Individuals, Full entry ...: ...: ...: ...: ...: ...:

Groups
(name, address etc.,
of all members) ...: ...: ...: ...: ...: ...:

Index of Idents ...: ...: ...: ...: ...: ...:

Organizations
(name, address of org,
with names of people) ...: ...: ...: ...: ...: ...:Would you miss the listings of people in each organization if they
were discontinued?

Comments about Directory.....

3. Check level of use you make of each section of the Catalog:

Current Catalog of the NIC Collection	indis- pensable	very useful	not useful	no opinion
Author Index	1..1	1..1	1..1	1..1
Number Index	1..1	1..1	1..1	1..1
Titleword Index	1..1	1..1	1..1	1..1
Listing (with abstracts)	1..1	1..1	1..1	1..1

Would you miss the abstracts if the Listing were discontinued?

Are RFC's almost the only items you refer to in the Catalog?

Comments about Catalog Indexes and Listing.....